

**U.S. Fish and Wildlife Service**

## **Spatial Information Management for National Wildlife Refuge System Lands**



**US Fish and Wildlife Service Southwest Region (R2)  
National Wildlife Refuge System (NWR)  
NWR Remote Sensing Lab, Division of Planning**

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## ***Vegetation Communities of Bosque del Apache National Wildlife Refuge***

***Submitted 01/11/06 by:***

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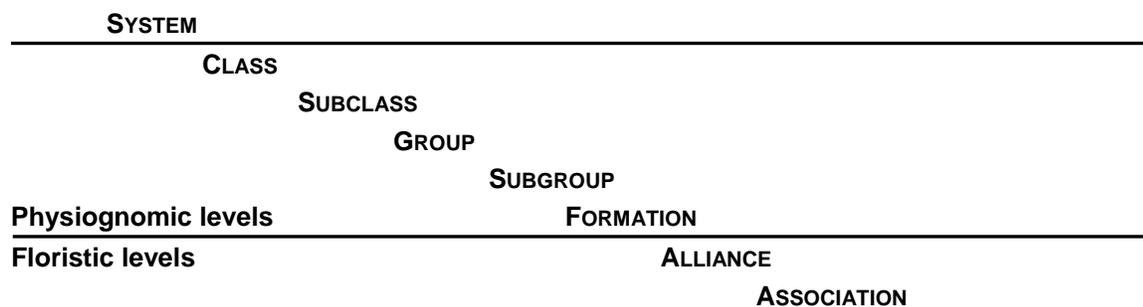
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## 1.0 Overview

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The vegetation classification schema presented in this document as of the date submitted encompass known plant communities derived from fieldwork conducted by the Natural Heritage New Mexico (NHNM) from July 30, through August 5, 2004 and by the National Wildlife (NWR) Refuge Remote Sensing Lab from January 2005 to January 2006. The initial work completed by NHNM was verified through field reconnaissance of 96 geo-referenced plots. These plots recorded the major dominants with a visual evaluation of percent cover along with basic environmental characteristics. Updates to this initial work were completed by the NWR Remote Sensing Lab. Over 9,000 spectrally derived and geo-referenced plots in the active and historic floodplain of the Refuge were visited. Plots were evaluated through ocular estimates of dominate species in multiple vegetation strata. Additions to the schema were made by identifying currently described plant communities not found by the initial NHNM fieldwork. In addition, other plant communities currently not described have been created to meet the exhaustive and mutually exclusive needs of the classification as well as needs specific Refuge resource management.

The classification systems used for this process are the National Vegetation Classification System (NVCS) (**Figure 1.0**) and NHNM state system. These systems may be viewed as identical as they both follow the same hierarchical, physiognomic and floristic structure. Because NVCS is support by state heritage programs, combining the systems allows access to communities that have been described by heritage programs, but have not yet made it through the aggregation process into NVCS. All data collection in the field occurred at Association level.



**Figure 1.0.** NVCS classification hierarchy. The National Vegetation Classification System (NVCS). The is a hierarchical classification system made up of physiognomic and floristic levels that can be applied to all terrestrial vegetation as well to wetland rooted vascular plants.

The vegetation schema are presented as a hierarchical table following the state system in which there is an initial division between riparian/wetland communities which are dominated by obligate and facultative wetland species as defined by the U.S. Fish and Wildlife Service (1988) national list and upland communities which are not. Within these two divisions, alliances and associations are listed alphabetically within the major formation types of Herbaceous Vegetation (mostly grasslands), Shrublands, and Forests or Woodlands. Where appropriate, we have listed potential associations for the refuge that have not yet been confirmed.

## 2.0 RIPARIAN / WETLAND COMMUNITIES

Vegetation dominated by obligate or facultative wetland species.

### 2.1 Herbaceous Riparian/Wetland Vegetation

Herbs (graminoids, forbs, and ferns) dominant (generally forming at least 25% cover). Trees, shrubs, and dwarf-shrubs generally with less than 25% cover. Herbaceous cover (rarely) may be less than 25% in cases when the cover of each of the other lifeforms present (i.e., tree, shrub, dwarf-shrub, nonvascular) is less than 25% and herbaceous cover exceeds the cover of the other lifeforms.

#### Lowland Persistent Emergent Herbaceous Wetland

##### Seasonally Flooded

###### *Juncus balticus* Herbaceous Alliance

###### *Juncus balticus* Herbaceous Association

**Distribution:** throughout New Mexico; scattered in the BDA Rio Grande floodplain.

**Habitat:** floodplains, backwater wetlands, pond margins.

**Associates:** *Distichlis spicata*, *Schoenoplectus pungens*.

**Comments:** commonly occurs as monotypic stands on BDA.

##### Semi-permanently Flooded

###### *Typha latifolia* Herbaceous Alliance

###### *Typha latifolia* Herbaceous Association

**Distribution:** throughout New Mexico; common on BDA

**Habitat:** springs, pond or lake margins, backwater areas, and former channels.

**Associates:** *Phragmites australis*

**Comments:** commonly occurs as monotypic stands or in association with *Phragmites australis* on BDA.

###### *Typha latifolia/Schoenoplectus acutus* Herbaceous Association

**Distribution:** throughout New Mexico; scattered in the BDA Rio Grande floodplain

**Habitat:** springs, pond or lake margins, backwater areas, and former channels.

**Associates:** *Phragmites australis*, *Distichlis spicata*

**Comments:**

###### *Phragmites australis* Herbaceous Alliance

###### *Phragmites australis* Herbaceous Association

**Distribution:** throughout New Mexico; common in the BDA Rio Grande floodplain

**Habitat:** springs, pond or lake margins, backwater areas, and former channels.

**Associates:** *Typha latifolia*

**Comments:** commonly occurs as monotypic stands or with *Typha latifolia*

## Intermittently Flooded

### ***Muhlenbergia asperifolia* Intermittently Flooded Herbaceous Alliance**

**Translated Name:** Alkali Muhly Intermittently Flooded Herbaceous Alliance

**Unique Identifier:** A.1334

**Distribution:** This grassland alliance occurs in intermittently flooded areas in the plains, mountain parks and meadows, valleys, canyons, and plateaus in Colorado and Utah. The flooding is usually the result of highly localized thunderstorms. Sites are found in lowland habitats such as playas, swales, terraces along intermittently flooded washes, and alkali flats. Soils are variable, ranging from deep, fine-textured soil to shallow sand deposits. They are alkaline, and may be moderately saline and poorly drained due to an impermeable layer. Vegetation included in this alliance is characterized by a sparse to dense graminoid layer that is dominated by *Muhlenbergia asperifolia* often forming nearly pure stands.

**Associates:** *Distichlis spicata*, *Pascopyrum smithii*, or *Sporobolus airoides* depending on geography. The exotic annual grasses *Bromus tectorum* and *Polygonum monspeliensis* are often abundant on disturbed sites. Forb cover is generally sparse, but may include species of *Atriplex*, *Polygonum*, and *Rumex*. Shrubs are rare, but because of the patchy distribution of these stands, scattered *Atriplex canescens* and *Sarcobatus vermiculatus* may be present from nearby shrublands. Diagnostic of this grassland alliance is a *Muhlenbergia asperifolia*-dominated herbaceous layer that occurs on lowland sites that are intermittently flooded.

**Comments:**

### ***Muhlenbergia asperifolia* Herbaceous Intermittently Flooded Association**

**Unique Identifier:** CEGLO01779

**Distribution:** On BDA this community was commonly found in wetlands and in areas adjacent or as co-dominant with *Distichlis spicata*.

**Habitats:** managed wetlands, alluvial bars and terraces of lowland floodplains, or alkaline swales and alluvial flats

**Comments:** From any distance, this grass can often be confused with *Distichlis spicata* except during late summer and fall when purple seed heads emerge.

## Temporarily Flooded

### ***Distichlis spicata* Herbaceous Alliance**

#### ***Distichlis spicata* Herbaceous Association**

**Distribution:** throughout New Mexico; common in the BDA Rio Grande floodplain

**Habitat:** alluvial bars and terraces of lowland floodplains, or alkaline swales and alluvial flats

**Associates:** *Muhlenbergia asperifolia*

**Comments:** commonly occurs as monotypic stands.

#### ***Distichlis spicata* - *Sporobolus airoides* Herbaceous Association**

**Distribution:** throughout New Mexico; common in the BDA Rio Grande floodplain

**Habitat:** alluvial bars and terraces of lowland floodplains, or alkaline swales and alluvial flats

**Associates:** *Atriplex canescens*, *Suaeda moquinii*, *Muhlenbergia asperifolia*

**Comments:** commonly occurs as monotypic stands.

***Distichlis spicata* - (*Hordeum jubatum*, *Poa arida*, *Sporobolus airoides*) Herbaceous**

**Vegetation**

**Translated Name:** Saltgrass - (Foxtail Barley, Prairie Bluegrass, Alkali Sacaton)  
Herbaceous Vegetation

**Unique Identifier:** C EGL002042

**Distribution:** saline wetland community is found in the central and southern Great Plains of the United States, on level to gently sloping stream terraces, foot slopes, and shallow depressions that are flooded for a few weeks in the spring. Soils are fine sand to clay, well to moderately poorly drained, and usually deep. The soils are moderately to strongly saline and tend to have alkaline pH. Dominant vegetation is halophytic short and mid grasses, which are moderately dense and tall on less saline sites and moderately sparse and shorter on more saline sites. Species diversity also increases on less saline sites. *Distichlis spicata* is typically one of the most abundant species.

**Habitat:** alluvial bars and terraces of lowland floodplains, or alkaline swales and alluvial flats

**Associates:** *Iva annua*, *Hordeum jubatum*, *Poa arida*, and *Sporobolus airoides* can be present to codominant. Other common species include *Leptochloa fusca* ssp. *fascicularis* (= *Leptochloa fascicularis*), *Pascopyrum smithii* (especially on less saline sites), *Suaeda calceoliformis*, and *Salicornia rubra*. Low shrubs, notably *Atriplex patula* and *Sarcobatus vermiculatus*, may be scattered across this community.

**Comments:** most abundant on northwest side of historic plain and some managed wetlands

***Hordeum jubatum* Temporarily Flooded Herbaceous Alliance**

**Translated Name:** Foxtail Barley Temporarily Flooded Herbaceous Alliance

**Unique Identifier:** A.1358

**Distribution:** This alliance is found in the northern and western Great Plains and is dominated by short and medium-tall graminoids with a total vegetation cover of nearly 100%. Shrubs are often absent, and forbs are present but not usually abundant. *Hordeum jubatum* is the dominant species.

**Habitats:** managed wetlands, alluvial bars and terraces of lowland floodplains, or alkaline swales and alluvial flats

**Associates:** *Elymus trachycaulus*, *Distichlis spicata*, *Pascopyrum smithii*, *Poa arida*, *Poa compressa*, *Rumex crispus*, and *Sonchus arvensis*. Stands are located in lowlands with moderately to strongly saline soils. The topography is flat and the soils are often briefly flooded or saturated in the spring.

**Comments:** This alliance is poorly defined. Where their ranges overlap, the relationship between this alliance and communities within the *Distichlis spicata* - (*Hordeum jubatum*) Temporarily Flooded Herbaceous Alliance (A.1341) is unclear. Stands in both alliances usually contain *Distichlis spicata* and *Hordeum jubatum* in varying amounts. The presence of *Puccinellia nuttalliana* or *Suaeda calceoliformis* may be distinguishing factors of the latter alliance. They appear to be more characteristic of strongly to very strongly saline areas, while *Hordeum jubatum* often dominates on less saline sites (Redmann 1972). Classification problems may arise on intermediate sites when *Hordeum jubatum* is the dominant species and *Distichlis spicata*, *Puccinellia nuttalliana*, and *Suaeda calceoliformis* are present in minor amounts. Some communities in the *Pascopyrum smithii* Herbaceous Alliance (A.1232) may be similar to, and may adjoin, the less saline portion of stands of this alliance in North Dakota.

***Hordeum jubatum* Herbaceous Temporarily Flooded Association**

**Unique Identifier:** C EGL001798

**Distribution:** Stands are found in lowlands with moderately to strongly saline soils. The topography is flat and the soils are often flooded or saturated in the

spring. The vegetation is dominated by short and medium tall graminoids with a total vegetation cover of nearly 100%. Shrubs are usually absent.

**Habitats:** managed wetlands, alluvial bars and terraces of lowland floodplains, or alkaline swales and alluvial flats

**Associates:** *Hordeum jubatum* dominates the community. Other common species in this community are *Sporobolus Airoides*, *Distichlis spicata*, *Pascopyrum smithii*, and *Muhlenbergia asperifolia*.

**Comments:** found throughout or around the edges of most of the managed wetlands.

## **Wetland Managed Temporarily Flooded Herbaceous Alliance**

### **Wetland Managed Temporarily Flooded Herbaceous Alliance**

**Distribution:** managed temporary wetlands within historic floodplain of BDA

**Associates/Dominants:** *Anemopsis californica*, *Chenopodium ssp.*, *Cyperus esculentus*, *Crypsis schoenoides*, *Echinochloa crusgalli*, *Eleocharis spp.* *Elymus X pseudorep*, *Hordeum jubatum*, *Juncus balticus*, *Leptochloa dascicularis*, *Panicum obtusum*, *Paspalum distichum*, *Polygonum ssp.* and *Polypogon monspeliensis*.

**Habitats:** Managed wetlands

**Comments:** This classification was used to describe managed wetlands. Within the data collected are recorded the dominant species observed within each plot and percentage of that species present.

## **2.2 Shrub Riparian/Wetland Vegetation**

Shrubs generally greater than 0.5 m tall with individuals or clumps not touching to overlapping (generally forming >25% canopy cover -- tree cover generally <25%). Shrub cover (rarely) may be less than 25% in cases when the cover of each of the other lifeforms present (i.e., tree, dwarf-shrub, herb, nonvascular) is less than 25% and shrub cover exceeds the cover of the other lifeforms.

### **Lowland Interior Southwest Riparian Shrubland Intermittently Flooded**

#### ***Chilopsis linearis* Shrubland Alliance**

##### ***Chilopsis linearis* / *Fallugia paradoxa* Shrubland Association**

**Distribution:** southern New Mexico; occasional on BDA within upland piedmonts (bajadas) and hills.

**Habitat:** arroyo washes.

**Associates:** *Atriplex canescens*, *Rhus microphylla*, *Artemisia filifolia*.

**Comments:** scattered stands in arroyo bottoms with very open canopies.

#### ***Fallugia paradoxa* Shrubland Alliance**

##### ***Fallugia paradoxa* Shrubland Association**

**Distribution:** southern New Mexico; occasional on BDA within upland piedmonts (bajadas) and hills.

**Habitat:** arroyo washes.

**Associates:** *Atriplex canescens*, *Rhus microphylla*, *Artemisia filifolia*.

**Comments:** scattered stands in arroyo bottoms with very open canopies.

#### ***Rhus microphylla* Shrubland Alliance**

##### ***Rhus microphylla* / Arroyo Shrubland Association**

**Distribution:** southern New Mexico; uncommon on BDA within upland piedmonts (bajadas) and hills.

**Habitat:** arroyo washes.

**Associates:** *Rhus trilobata*, *Aloysia wrightii*, *Bouteloua curtipendula*.

**Comments:** scattered stands in arroyo bottoms with very open canopies.

***Sarcobatus vermiculatus* Intermittently Flooded Shrubland Alliance**

***Sarcobatus vermiculatus* / *Distichlis spicata* Shrubland**

**Translated Name:** Black Greasewood / Saltgrass Shrubland

**Unique Identifier:** CEGLO01363

**Distribution:** This association is reported from western Montana to Washington, south to Nevada, Utah and Colorado. Elevation ranges from approximately 600-2300 m. It forms expansive shrublands on broad floodplains along large rivers and streams, and forms an outer ring around playas above the *Distichlis spicata*-dominated center. Flooding is generally intermittent. Substrates are deep, alkaline, saline and generally fine-textured soils with a perennial high water table. However, in southern Colorado's San Luis valley, stands grow between salt flat depressions (playas) on sandy hummocks approximately 1.2 m above the lakebed. The vegetation is characterized by a fairly open to moderate shrub canopy (18-60% cover) dominated by *Sarcobatus vermiculatus* with an herbaceous layer dominated by the rhizomatous graminoid *Distichlis spicata* (10-80% cover).

**Habitats:** salt flat depressions (playas)

**Associates:** shrubs and dwarf-shrubs may include *Ericameria nauseosa*, *Gutierrezia sarothrae*, and *Tetradymia canescens*. *Sporobolus airoides* may codominate the graminoid layer, and *Hordeum jubatum* is common in disturbed stands. *Juncus balticus* and *Leymus cinereus* are also present in some stands. The forb layer is generally sparse and composed of species such as *Iva axillaris* and *Ipomopsis* spp. Introduced species may be present to abundant in disturbed stands.

**Comments:** found primarily on northwest side of historic floodplain

***Sarcobatus vermiculatus* Shrubland**

**Translated Name:** Black Greasewood Shrubland

**Unique Identifier:** CEGLO01357

**Distribution:** found primarily on northwest side of historic floodplain

**Habitats:** salt flat depressions (playas)

**Associates:** *Distichlis spicata*, *Hordeum jubatum* and *Sporobolus airoides*,

**Comments:** found primarily on northwest side of historic floodplain

***Sarcobatus vermiculatus* / *Suaeda moquinii* Shrubland**

**Translated Name:** Black Greasewood / Shrubby Seepweed Shrubland

**Unique Identifier:** CEGLO01370

**Distribution:** found primarily on northwest side of historic floodplain

**Habitats:** salt flat depressions (playas)

**Associates:** *Distichlis spicata*, *Hordeum jubatum* and *Sporobolus airoides*,

**Comments:** found primarily on northwest side of historic floodplain

**Temporarily Flooded**

***Baccharis salicifolia* Shrubland Alliance**

*Baccharis salicifolia* / Mesic Forb-Graminoid Shrubland Association

Distribution: common in southern New Mexico; occasional in the BDA Rio Grande floodplain.

Habitat: alluvial bars and terraces.

Associates: *Prosopis pubescens*, *Salix exigua*, *Sporobolus airoides*, *Muhlenbergia asperifolia*, *Tamarix ramosissima*.

Comments: prevalent along the eastern edge of the floodplain. Occasional patches among forest stands.

***Prosopis pubescens* Shrubland Alliance**

*Prosopis pubescens*/*Sporobolus airoides* Shrubland Association

Distribution: occasional in southern New Mexico and in the BDA Rio Grande floodplain.

Habitat: alluvial bars and terraces.

Associates: *Salix exigua*, *Baccharis salicifolia*, *Muhlenbergia asperifolia*, *Distichlis spicata*, *Tamarix ramosissima*.

Comments: prevalent along the eastern edge of the floodplain. Occasional patches among forest stands.

**Lowland Western Riparian/Wetland Shrubland**

**Temporarily Flooded**

***Suaeda moquinii* Shrubland Alliance**

***Suaeda moquinii* Shrubland Association**

**Distribution:** infrequent in New Mexico; occasional in the BDA Rio Grande floodplain.

**Habitat:** alkali alluvial flats.

**Associates:** *Atriplex canescens*, *Sporobolus airoides*, *Distichlis spicata*.

**Comments:** prevalent in the northwest portion of the floodplain within the refuge.

***Salix exigua* Shrubland Alliance**

***Salix exigua* / Mesic Forbs Shrubland Association**

**Distribution:** common in southern New Mexico; common in the BDA Rio Grande floodplain.

**Habitat:** alluvial bars and terraces, pond margins.

**Associates:** *Anemopsis californica*, *Plantago major*, *Apocynum cannabinum*, *Tamarix ramosissima*, *Baccharis salicifolia*.

**Comments:** occurs primarily along pond margins and occasionally as patches among forest stands.

***Salix exigua* / Mesic Graminoids Shrubland Association**

**Distribution:** common in southern New Mexico; common in the BDA Rio Grande floodplain.

**Habitat:** alluvial bars and terraces, pond margins.

**Associates:** *Sporobolus airoides*, *Muhlenbergia asperifolia*, *Tamarix ramosissima*, *Baccharis salicifolia*.

**Comments:** occurs primarily along pond margins and occasionally as patches among forest stands.

***Salix exigua* / *Elymus X pseudorepens* Shrubland Association**

**Translated Name:** Coyote Willow / Quackgrass Shrubland

**Unique Identifier:** CEGLO01198

**Distribution:** This is a lowland riparian shrubland association known from the middle and upper Rio Grande watershed in north-central New Mexico. This type is associated with low-gradient rivers at elevations around 1830 m (6000 feet). Stands occur on depositional sidebars or island bars that are frequently flooded (annually). Soils have been reported as loamy and sandy-skeletal Aeric Fluvaquents that are normally wet within 0.5 m of the surface.

**Habitat:** alluvial bars and terraces, pond margins

**Habitat:** alluvial bars and terraces, pond margins.

**Associates:** characterized by moderate to dense canopies of *Salix exigua*. The understory is grassy and dominated by abundant *Elymus X pseudorepens*. An additional nine wetland indicators have been recorded for the type: *Carex pellita* (= *Carex lanuginosa*), *Muhlenbergia racemosa*, *Argentina anserina*, *Boehmeria cylindrica*, *Equisetum arvense*, *Equisetum laevigatum*, *Lycopus asper*, *Oenothera elata* ssp. *hirsutissima*, and *Rumex verticillatus*.

**Comments:** rare on BDA

***Salix exigua* / Barren Shrubland Association**

**Translated Name:** Coyote Willow / Barren Shrubland

**Unique Identifier:** CEGLO01200

**Distribution:** shrubland is common in the Rocky Mountains, Colorado Plateau and Great Basin. It is composed of nearly pure stands of *Salix exigua*, with few other species. Exposed gravel, cobbles or sand characterize the ground cover, but an undergrowth of a few, scattered forbs and grasses is usually present. This association occurs within the annual flood zone of rivers on point bars, islands, sand or cobble bars, and stream banks.

**Habitat:** alluvial bars and terraces, pond margins.

**Comments:** Common on sandbars, river margins and scoured areas of active floodplain

### **Salix exigua Temporarily Flooded Shrubland Association**

**Translated Name:** Coyote Willow Temporarily Flooded Shrubland

**Common Name:** Coyote Willow Shrubland

Unique Identifier: CEGLO01197

**Distribution:** throughout the northwestern United States and Great Plains. This type is an early successional stage that occurs along rivers and streams at lower elevations, on recently flooded riparian areas, and in moist swales and ditches that are frequently disturbed. Stands occur most commonly on alluvial sand, but silt, clay, or gravel may also be present. *Salix exigua* is the dominant canopy species (*Salix interior* or intermediates of the two willow species may be present in the eastern part of the range). It can form dense stands up to 4 m tall, but there are often patches where the shrub layer is absent. Seedlings and small saplings of *Populus deltoides* and *Salix amygdaloides* may be present. The herbaceous cover is sparse to moderate, but rarely exceeds 30%.

**Associates:** Species present include *Cenchrus longispinus*, *Polygonum lapathifolium*, *Schoenoplectus americanus* (= *Scirpus americanus*), *Triglochin maritima*, and *Xanthium strumarium*. The composition of this community, especially the herbaceous layer, varies from year to year with succession or renewed disturbance.

**Habitat:** alluvial bars and terraces, pond margins.

**Comments:** Schema used to classify monotypic stands that showed little or no association with mesic graminoid or forb species. This type may be an early-successional shrubland that develops into *Salix exigua* / Mesic Graminoids Shrubland (CEGL001203), or the two types may be essentially synonymous. This plant association occupies a wide geographic range.

## **Lowland Exotic Riparian/Wetland Shrubland**

### **Temporarily Flooded**

#### ***Tamarix ramosissima* Alien Shrubland Alliance**

##### ***Tamarix ramosissima* / *Distichlis spicata* Alien Shrubland Association**

**Distribution:** Rio Grande and Pecos River basins in central and southern New Mexico, and in the San Juan River Basin in northwestern New Mexico. Common in the BDA Rio Grande floodplain.

**Habitat:** alluvial bars and terraces, alkali alluvial flats.

**Associates:** *Muhlenbergia asperifolia*.

**Comments:** primarily in the western sector of the floodplain, outside the levies.

##### ***Tamarix ramosissima* / *Sporobolus airoides* Alien Shrubland Association**

**Distribution:** widespread in the Pecos and Rio Grande basins in central and southern New Mexico. Common in the BDA Rio Grande floodplain.

**Habitat:** alluvial bars and terraces, alkali alluvial flats.

**Associates:** *Muhlenbergia asperifolia*, *Distichlis spicata*.

**Comments:** primarily in northwest sector of the refuge.

##### ***Tamarix ramosissima* / Sparse Alien Shrubland Association**

**Distribution:** widespread in New Mexico. Abundant in the BDA Rio Grande floodplain.

**Habitat:** alluvial bars and terraces, alkali alluvial flats.

**Associates:** *Populus deltoides*, *Salix exigua*, *Salix gooddingii*.

**Comments:** especially abundant within the levies of BDA.

***Tamarix ramosissima* Monotypic Alien Shrubland Association**

**Distribution:** Refuge specific community, but common in other portions of Middle Rio Grande

**Habitat:** alluvial bars and terraces, alkali alluvial flats.

**Associates:** *none*

**Comments:** abundant inside the levies of BDA in large dense monotypic stands.

***Tamarix ramosissima* Mixed Alien Shrubland Association**

**Distribution:** Refuge specific descriptive community

**Habitat:** alluvial bars and terraces, alkali alluvial flats.

**Associates:**

**Comments:** will be assessed based on summary of field data collected and broken out into named associations.

### **2.3 Forest and Woodland Riparian/Wetland Vegetation**

Forest: trees with their crowns overlapping (generally forming 60-100% cover). Woodlands: open stands of trees with crowns not usually touching (generally forming 25 to 60% cover). Canopy tree cover (rarely) may be less than 25% in cases when the cover of each of the other lifeforms present (i.e., shrub, dwarf-shrub, herb, nonvascular) is less than 25% and tree cover exceeds the cover of the other lifeforms.

#### **Lowland Interior Southwest Riparian/Wetland Forests and Woodlands Temporarily Flooded**

##### ***Elaeagnus angustifolia* Alien Forest Alliance**

###### ***Elaeagnus angustifolia* / *Salix exigua* Alien Forest Association**

**Distribution:** Middle Rio Grande in New Mexico.

**Habitat:** alluvial bars and terraces, backwater wetlands, pond margins.

**Associates:** *Muhlenbergia asperifolia*, *Apocynum cannabinum*, *Salix gooddingii*, *Tamarix ramosissima*.

**Comments:**

###### ***Elaeagnus angustifolia* / *Sporobolus airoides* Alien Forest Association**

**Distribution:** Middle Rio Grande in New Mexico.

**Habitat:** alluvial bars and terraces, backwater wetlands, pond margins.

**Associates:** *Muhlenbergia asperifolia*, *Apocynum cannabinum*, *Distichlis spicata*, *Tamarix ramosissima*.

**Comments:** found on northwest historic floodplain

###### ***Elaeagnus angustifolia* / *Tamarix ramosissima* Alien Forest Association**

**Distribution:** Middle Rio Grande in New Mexico.

**Habitat:** alluvial bars and terraces, backwater wetlands, pond margins.

**Associates:** *Muhlenbergia asperifolia*, *Apocynum cannabinum*, *Distichlis spicata*

**Comments:** found on northwest historic floodplain

##### ***Populus deltoides* ssp. *wislizeni* Forest and Woodland Alliances**

###### ***Populus deltoides* ssp. *wislizeni* / *Baccharis salicifolia* Woodland Association**

**Distribution:** Rio Grande and Pecos River basins in central and southern New Mexico. Occasional in the BDA Rio Grande floodplain.

**Habitat:** alluvial bars and terraces, backwater wetlands, pond margins.

**Associates:** *Muhlenbergia asperifolia*, *Apocynum cannabinum*, *Salix gooddingii*, *Tamarix ramosissima*, *Elaeagnus angustifolia*.

**Comments:** mature, moderately open to closed canopied woodlands and forests.

###### ***Populus deltoides* ssp. *wislizeni* / *Distichlis spicata* Woodland Association**

**Distribution:** Rio Grande and Pecos River basins in central and southern New Mexico. Occasional in the BDA Rio Grande floodplain.

**Habitat:** alluvial bars and terraces.

**Associates:** *Muhlenbergia asperifolia*, *Tamarix ramosissima*.

**Comments:** mature or senescent, open canopied woodlands primarily in the western sector of the floodplain, outside the levies.

***Populus deltoides* ssp. *wislizeni* - *Elaeagnus angustifolia*/*Forestiera pubescens*  
Semi-natural Woodland Association**

**Distribution:** throughout New Mexico. Common in the BDA Rio Grande floodplain.

**Habitat:** alluvial bars and terraces, backwater wetlands, pond margins.

**Associates:** *Tamarix ramosissima*.

**Comments:** typically, mature forest heavily invaded by exotics and low in overall diversity. Particularly prevalent within the levies.

***Populus deltoides* ssp. *wislizeni* - *Elaeagnus angustifolia*/*Tamarix ramosissima*  
Semi-natural Woodland Association**

**Distribution:** throughout New Mexico. Common in the BDA Rio Grande floodplain.

**Habitat:** alluvial bars and terraces, backwater wetlands, pond margins.

**Associates:** *Salix exigua*, *Baccharis salicina*

**Comments:** typically, mature forest heavily invaded by exotics and low in overall diversity. Particularly prevalent within the levies.

***Populus deltoides* ssp. *wislizeni* / *Forestiera pubescens* Woodland Association**

**Distribution:** San Juan and Rio Grande watersheds in northern and central New Mexico. Common in the BDA Rio Grande floodplain.

**Habitat:** alluvial bars and terraces.

**Associates:** *Salix gooddingii*, *Muhlenbergia asperifolia*, *Baccharis salicifolia*.

**Comments:** mature, moderately open to closed canopied woodlands and forests.

***Populus deltoides* ssp. *wislizeni* Mixed Woodland Association**

**Distribution:** Refuge specific descriptive community

**Habitat:** alluvial bars and terraces, alkali alluvial flats.

**Associates:**

**Comments:** will be assessed based on summary of field data collected and broken out into named associations

***Populus deltoides* ssp. *wislizeni* monotypic Woodland Association**

**Distribution:** Rio Grande river floodplain in central New Mexico. Common in the BDA Rio Grande floodplain.

**Habitat:** alluvial bars and terraces.

**Associates:** leaf litter and downed woody vegetation

**Comments:** mature, moderately open to closed canopied woodlands and forests.

***Populus deltoides* / *Muhlenbergia asperifolia* Forest Association**

**Translated Name:** Eastern Cottonwood / Alkali Muhly Forest

**Unique Identifier:** CEGLO00678

**Distribution:** lowland forested riparian association known from the Rio Grande and Pecos drainages of central New Mexico and the Arkansas River in southeastern Colorado. This association occurs in lowland river valleys at elevations ranging from 1180-1680 m (3850-5500 feet). Typical sites are mid- to upper-elevation bars and terraces within the active floodplain. Soils are young, weakly developed Entisols.

**Habitat:** alluvial bars and terraces.

**Associates:** often dominated by older, open stands of *Populus deltoides* ssp. *wislizeni* or *Populus deltoides* ssp. *monilifera* with grassy understories dominated by *Muhlenbergia asperifolia* (the characteristic herbaceous species) and *Distichlis spicata* (up to 80% total herbaceous cover). *Salix amygdaloides* is present in the tree canopies of some stands. Shrubs are few and scattered,

although invasive and exotic *Tamarix* spp. and *Elaeagnus angustifolia* are often abundant. Other herbaceous species may include *Scirpus microcarpus*, *Panicum virgatum*, and *Eleocharis palustris*. A few weedy forbs include *Apocynum cannabinum* and *Ambrosia artemisiifolia*.

**Comments:** The *Populus deltoides* ssp. *wislizeni* / *Muhlenbergia asperifolia* plant association described from New Mexico (Dick-Peddie et al. 1984) is the same as the Colorado type, *Populus deltoides* ssp. *monilifera* / *Muhlenbergia asperifolia* plant association (Kittel et al. 1999). However, the subspecies of cottonwood is different, with Colorado stands dominated by *Populus deltoides* ssp. *monilifera* (plains cottonwood) and the New Mexico stands dominated by *Populus deltoides* ssp. *wislizeni* (Rio Grande cottonwood). *Populus deltoides* (ssp. *wislizenii*, ssp. *monilifera*) / *Distichlis spicata* Woodland (CEGL000939), described from Colorado (Lindauer 1970, Christy 1973), is similar to this type, as the stands of *Populus deltoides* / *Muhlenbergia asperifolia* Forest (CEGL000678) often contain some *Distichlis spicata*.

***Populus deltoides* ssp. *wislizeni* Planted Forest Association**

**Distribution:** Middle Rio Grande in New Mexico. Occasional in the BDA Rio Grande floodplain.

**Habitat:** alluvial bars and terraces, backwater wetlands, pond margins.

**Associates:**

***Populus deltoides* ssp. *wislizeni* / *Salix exigua* Woodland Association**

**Distribution:** Throughout New Mexico. Common in the BDA Rio Grande floodplain.

**Habitat:** alluvial bars and terraces, backwater wetlands, pond margins.

**Associates:** *Muhlenbergia asperifolia*, *Apocynum cannabinum*, *Salix gooddingii*, *Tamarix ramosissima*, *Elaeagnus angustifolia*.

**Comments:** typically younger pole to middle aged cottonwood stands.

***Populus deltoides* ssp. *wislizeni* - *Salix gooddingii* Woodland Association**

**Distribution:** Rio Grande and Pecos River basins in central and southern New Mexico. Common in the BDA Rio Grande floodplain.

**Habitat:** alluvial bars and terraces.

**Associates:**

**Comments:** mature, moderately open to closed canopied woodlands and forests, often with sparse understories.

***Populus deltoides* ssp. *wislizeni* / *Sporobolus airoides* Woodland Association**

**Distribution:** Rio Grande and Pecos River basins in central and southern New Mexico. Common in the BDA Rio Grande floodplain.

**Habitat:** alluvial bars and terraces.

**Associates:** *Muhlenbergia asperifolia*.

**Comments:** mature or senescent, open canopied woodlands primarily in the western sector of the floodplain, outside the levies.

***Populus deltoides* ssp. *wislizeni* / *Tamarix ramosissima* Semi-natural Woodland Association**

**Distribution:** throughout New Mexico. Common in the BDA Rio Grande floodplain.

**Habitat:** alluvial bars and terraces, backwater wetlands, pond margins.

**Associates:** *Elaeagnus angustifolia*.

**Comments:** typically, mature forest heavily invaded by exotics and low in overall diversity. Particularly prevalent within the levies.

***Populus deltoides* ssp. *wislizeni* / Restoration Woodland Association**

**Distribution:** Middle Rio Grande in New Mexico. Common in the BDA Rio Grande floodplain restoration areas.

**Habitat:** alluvial bars and terraces, backwater wetlands, pond margins.

**Associates:**

**Comments:** older forests and woodlands that have been cleared of understory exotics.

**Comments:** young pole-planted woodlands on reclamation sites.

***Populus deltoides* ssp. *wislizeni* / *Elymus X pseudorepens* Forest**

Translated Name: Rio Grande Cottonwood / Quackgrass Forest

Unique Identifier: CEGLO02715

**Distribution:** from the Rio Grande, Pecos and Canadian River drainages of central and eastern New Mexico and probably elsewhere in northern New Mexico. It also occurs in the Great Plains in Colorado, North Dakota, Nebraska, Oklahoma, South Dakota, and Texas. This association occurs in wide river corridors that have low-gradient and primarily sandy/gravelly beds (becoming cobbly with increasing gradients). Elevations range from 1380-1980 m (4525-6500 feet). The type is most often found proximal to perennial rivers on low sidebars and stream banks near stream bankfull levels (discharge ratios close to one). Occasionally, it can be found within the active channel or nearby. Because of its low position, the type is flooded frequently (average recurrence interval is 5 years). Most soils are young and undeveloped Entisols, and soils within the active channel are classified as Riverwash. Soils tend to be well-drained sands with mixtures of cobbles and gravels throughout the profile. Most soils tend to be moist or wet within 1 m, at least during seasonal high water. In some soils, moisture indicators are found at greater depths. This association is dominated by relatively young stands of *Populus deltoides* that form open to moderately open overstories (25-50 % cover) with thickets of *Salix exigua* in the understory.

**Habitat:** alluvial bars and terraces, backwater wetlands, pond margins.

**Associates:** *Baccharis salicina* is often well-represented to abundant and may codominate. Herbaceous cover is abundant, particularly among graminoids, and numerous (23) native wetland indicators can be present such as *Schoenoplectus pungens* (= *Scirpus pungens*), *Scirpus microcarpus*, *Eleocharis palustris*, *Juncus balticus*, *Juncus longistylis*, *Juncus tenuis*, *Glyceria striata*, *Carex aquatilis*, *Carex oreocharis*, *Carex scoparia*, *Carex stipata*, *Equisetum arvense*, and *Equisetum laevigatum*. Overall, herbaceous diversity is high (90 species), and still predominantly native in composition (66 species, or 73%).

**Comments:** Rare on BDA

***Populus deltoides* ssp. *wislizeni* / *Anemopsis californica* Forest**

Translated Name: Rio Grande Cottonwood / Yerba Mansa Forest

Unique Identifier: CEGLO05965

**Distribution:** found in the Rio Grande basin in central New Mexico. This mature forest association is found within the floodplain of large, lowland river valleys at elevations from 1450 to 1550 m (4780-5080 feet). Sites are moist depressions in riverbars and terraces, or possibly filled side channels that are flooded relatively frequently (2- to 5-year recurrence interval). Soils are deep, weakly developed, sometimes poorly drained and often saturated, coarse-loamy Aquic Ustifluvents. This type may have been more widespread in the past. Mature *Populus deltoides* ssp. *wislizeni* dominate the upper canopy, although *Elaeagnus angustifolia* may also be a dominant subcanopy tree. Other shrubs such as *Tamarix ramosissima* may be prevalent, but the dominant understory species is *Anemopsis californica* which forms large mats along the soil surface.

**Habitat:** alluvial bars and terraces, backwater wetlands, pond margins.

**Associates:** *Sporobolus airoides*, *Tamarix ramosissima*, *Elaeagnus angustifolia*, *Panicum capillare*, and *Ambrosia artemisiifolia*.

**Comments:** As a keystone species, the reproduction of *Populus deltoides* after flooding (and sufficient subsequent base flows) is critical to the sustainability of this community.

***Populus deltoides*/Sparse Forest Association**

**Distribution:** throughout New Mexico. Common in the BDA Rio Grande floodplain.

**Habitat:** alluvial bars and terraces, backwater wetlands, pond margins.

**Associates:** *Salix exigua*, *Baccharis salicina*

**Comments:** typically, mature forest heavily invaded by exotics and low in overall diversity. Particularly prevalent adjacent to river channel

***Salix gooddingii* Forest Alliance**

***Salix gooddingii* / *Salix exigua* Forest Association**

**Distribution:** Middle Rio Grande in New Mexico. Habitat: backwater wetlands, pond margins.

**Habitat:** alluvial bars and terraces, backwater wetlands, pond margins.

**Associates:**

**Comments:** not previously reported.

***Salix gooddingii* Mixed Woodland Association**

**Distribution:** Refuge specific descriptive community

**Habitat:** alluvial bars and terraces, alkali alluvial flats.

**Associates:**

**Comments:** will be assessed based on summary of field data collected and broken out into named associations

***Salix gooddingii* monotypic Woodland Association**

**Distribution:** Rio Grande river floodplain in central New Mexico. Common in the BDA Rio Grande floodplain.

**Habitat:** alluvial bars and terraces.

**Associates:** leaf litter and downed woody vegetation

**Comments:** mature, moderately open to closed canopied woodlands and forests.

## 3.0 UPLAND VEGETATION

Vegetation dominated by obligate or facultative upland species.

### 3.1 Grassland Vegetation

Herbs (graminoids, forbs, and ferns) dominant (generally forming at least 25% cover). Trees, shrubs, and dwarf-shrubs generally with less than 25% cover. Herbaceous cover (rarely) may be less than 25% in cases when the cover of each of the other lifeforms present (i.e., tree, shrub, dwarf-shrub, nonvascular) is less than 25% and herbaceous cover exceeds the cover of the other lifeforms.

#### **Cold Temperate Grassland Great Plains Grassland**

##### ***Bouteloua curtipendula* Grassland Alliance**

###### ***Bouteloua curtipendula* - *Bothriochloa barbinodis* Herbaceous Association**

**Distribution:** south-central New Mexico, and likely elsewhere in the state; Arizona. Uncommon on BDA in the Little San Pasqual Mountains.

**Habitat:** arroyo washes.

**Associates:** *Aristida purpurea*, *Muhlenbergia porteri*, *Artemisia ludoviciana*.

**Comments:**

#### **Warm Temperate Grassland Chihuahuan Foothill-Piedmont Desert Grassland**

##### ***Bouteloua eriopoda* Xenomorphic Shrub Herbaceous Alliance**

###### ***Bouteloua eriopoda* / *Krascheninnikovia lanata* Shrub Herbaceous Association**

**Distribution:** south-central New Mexico. Uncommon on BDA in the Little San Pasqual Mountains.

**Habitat:** hill slopes and piedmonts (bajadas).

**Associates:** *Sporobolus flexuosus*, *Aristida purpurea*, *Opuntia phaeacantha*.

**Comments:**

###### ***Bouteloua eriopoda* / *Parthenium incanum* Grassland Shrub Herbaceous Association**

**Distribution:** southern New Mexico. Occasional on BDA in the Little San Pasqual Mountains; likely in Indian Wells and Chupadera wildernesses.

**Habitat:** upper piedmont slopes (bajadas) and lower hill slopes.

**Associates:** *Larrea tridentata*, *Gutierrezia sarothrae*, *Dalea formosa*, *Opuntia phaeacantha*.

**Comments:** minor association often intermixed with *Larrea tridentata* - *Parthenium incanum* Shrubland.

###### ***Bouteloua eriopoda* - *Yucca elata* Shrub Herbaceous Association**

**Distribution:** south-central New Mexico. Common on BDA in the northern Jornada basin and Little San Pasqual Mountains.

**Habitat:** sandy plains and north-facing piedmonts (bajadas).

**Associates:** *Hilaria jamesii*, *Gutierrezia sarothrae*, *Ephedra torreyana*, *Bahia absinthifolia*.

**Comments:** often found intermixed with *Artemisia filifolia* / *Bouteloua eriopoda* Shrubland; a major grassland type on adjacent WSMR sandy plains.

### ***Sporobolus flexuosus* Herbaceous Alliance**

#### ***Sporobolus flexuosus*-*Sporobolus contractus* Herbaceous Association**

**Distribution:** south-central New Mexico. Uncommon in BDA east side dunes.

**Habitat:** sandy plains.

**Associates:** *Gutierrezia sarothrae*, *Aristida purpurea*, *Sporobolus cryptandrus*.

**Comments:** minor association with scattered stands among *Artemisia filifolia* and *Psoralea scoparius* shrublands.

### ***Stipa neomexicana* Grassland Alliance**

#### ***Stipa neomexicana* - *Bouteloua eriopoda* Herbaceous Association**

**Distribution:** south-central New Mexico, and likely elsewhere in the state.

Uncommon on BDA in the Little San Pasqual Mountains.

**Habitat:** cool north-facing hill slopes (5,100 ft); possible on the upper piedmont (bajadas).

**Associates:** *Gutierrezia sarothrae*, *Ephedra torreyana*, *Thymophylla acerosa*, *Dalea formosa*.

**Comments:** known from only one small occurrence on BDA.

## **Chihuahuan Lowland-Swale Desert Grassland**

### ***Sporobolus airoides* Herbaceous Alliance**

#### ***Sporobolus airoides* Monotype Herbaceous Association**

**Translated Name:** Alkali Sacaton Monotype Herbaceous Vegetation

**Unique Identifier:** CEGLO01688

**Distribution:** sacaton mesic grassland community is found in the southwestern Great Plains, in the southwestern United States, and adjacent Mexico. Stands occur on slightly to moderately saline, nearly level bottomlands and terraces. Additional moisture from washes and sheet flow runoff are important to many stands. Substrates are shallow, moderately well- to poorly drained, silty clay soils formed in alluvium. The community is dominated by medium-tall and short grasses.

**Habitat:** alluvial bars and terraces of lowland floodplains, or alkaline swales and alluvial flats

**Comments:**

#### ***Sporobolus airoides* Southern Plains Herbaceous Association**

**Translated Name:** Alkali Sacaton Southern Plains Herbaceous Vegetation

**Unique Identifier:** CEGLO01685

**Distribution:** sacaton mesic grassland community is found in the southwestern Great Plains, in the southwestern United States, and adjacent Mexico. Stands occur on slightly to moderately saline, nearly level bottomlands and terraces. Additional moisture from washes and sheet flow runoff are important to many stands. Substrates are shallow, moderately well- to poorly drained, silty clay soils formed in alluvium. The community is dominated by medium-tall and short grasses.

**Habitat:** alluvial bars and terraces of lowland floodplains, or alkaline swales and alluvial flats

**Associates:** *Symphytotrichum subulatum* (= *Aster subulatus*), *Pascopyrum smithii*, *Buchloe dactyloides*, *Distichlis spicata*, *Hordeum jubatum*, and *Bouteloua gracilis*. Scattered shrubs such as *Atriplex* spp. or *Sarcobatus vermiculatus* may be present. Forb cover is also minor.

**Comments:**

### **3.2 Shrubland Vegetation**

Shrubs generally greater than 0.5 m tall with individuals or clumps not touching to overlapping (generally forming >25% canopy cover -- tree cover generally <25%). Shrub cover (rarely) may be less than 25% in cases when the cover of each of the other lifeforms present (i.e., tree, dwarf-shrub, herb, nonvascular) is less than 25% and shrub cover exceeds the cover of the other lifeforms.

#### **Warm Temperate Shrubland Chihuahuan Desert Sand Scrub**

##### ***Artemisia filifolia* Shrubland Alliance**

###### ***Artemisia filifolia* / *Bouteloua eriopoda* Shrubland Association**

**Distribution:** southern New Mexico. Common in BDA east side dunes, northern Jornada basin, and Little San Pasqual Mountains.

**Habitat:** sandy plains.

**Associates:** *Yucca elata*, *Hilaria jamesii*, *Ephedra trifurca*, *Gutierrezia sarothrae*, *Aristida purpurea*, *Sporobolus flexuosus*, *Oryzopsis hymenoides*.

**Comments:** often found intermixed with *Bouteloua eriopoda* / *Yucca elata* Grassland and other associations of the alliance; a major shrubland type on adjacent WSMR sandy plains.

###### ***Artemisia filifolia* / *Muhlenbergia porteri* Shrubland Association**

**Distribution:** southern New Mexico. Uncommon in BDA east side dunes, northern Jornada basin, and Little San Pasqual Mountains.

**Habitat:** swales of sandy plains.

**Associates:** *Atriplex canescens*, *Yucca elata*, *Ephedra trifurca*, *Gutierrezia sarothrae*, *Aristida purpurea*, *Sporobolus cryptandrus*.

**Comments:** often found intermixed with *Bouteloua eriopoda* / *Yucca elata* Grassland and other associations of the alliance.

###### ***Artemisia filifolia* / *Sporobolus flexuosus* (*S. contractus*, *S. cryptandrus*, *S. giganteus*) Shrubland Association**

**Distribution:** southern New Mexico. Common in BDA east side dunes, northern Jornada basin, and Little San Pasqual Mountains. Occasional on the east side of the refuge and in the floodplain.

**Habitat:** sandy plains and dunelands.

**Associates:** *Atriplex canescens*, *Yucca elata*, *Gutierrezia sarothrae*, *Sporobolus cryptandrus*, *S. giganteus*, *Oryzopsis hymenoides*, *Baileya pleniradiata*, *Psoralea scoparius*.

**Comments:** often found intermixed with *Bouteloua eriopoda* / *Yucca elata* Grassland and other associations of the alliance. Mixed stands with the *Psoralea scoparius* / *Sporobolus flexuosus* Association commonly occur. Intershrib spaces can be very sparse.

### **Atriplex canescens Shrubland Alliance**

#### ***Atriplex canescens* / *Sporobolus flexuosus* Shrubland Association**

**Distribution:** southern New Mexico. Occasional in BDA east side dunes, northern Jornada basin, and Little San Pasqual Mountains. Occasional on the east side of the refuge and in the floodplain.

**Habitat:** sandy plains and dunelands.

**Associates:** *Artemisia filifolia*, *Psoralea scoparius*, *Yucca elata*, *Gutierrezia sarothrae*, *Sporobolus cryptandrus*, *S. giganteus*, *Oryzopsis hymenoides*, *Baileya pleniradiata*, *Muhlenbergia porteri*.

**Comments:** often found intermixed with *Bouteloua eriopoda* / *Yucca elata* Grassland and associations of the *Artemisia filifolia* and *Psoralea scoparius* alliances. Intershrub spaces can be very sparse.

### **Psoralea scoparius Shrubland Alliance**

#### ***Psoralea scoparius* / *Oryzopsis hymenoides* Shrubland Association**

**Distribution:** central New Mexico. Uncommon in BDA east side dunes, northern Jornada basin, and Little San Pasqual Mountains.

**Habitat:** dunelands.

**Associates:** *Artemisia filifolia*, *Atriplex canescens*, *Sporobolus flexuosus*, *S. giganteus*.

**Comments:** intershrub spaces can be very sparse. Not recorded elsewhere in the state.

#### ***Psoralea scoparius* / *Sporobolus flexuosus* (*S. contractus*, *S. cryptandrus*, *S. giganteus*) Shrubland Association**

**Distribution:** southern New Mexico. Common in BDA east side dunes, northern Jornada basin, and Little San Pasqual Mountains. Occasional on the east side of the refuge and in the floodplain.

**Habitat:** dunelands.

**Associates:** *Artemisia filifolia*, *Atriplex canescens*, *Yucca elata*, *Ephedra trifurca*, *Gutierrezia sarothrae*, *Sporobolus contractus*, *S. giganteus*, *Muhlenbergia porteri*, *Baileya pleniradiata*.

**Comments:** mixed stands with the *Artemisia filifolia* / *Sporobolus flexuosus* Association commonly occur. Intershrub spaces can be very sparse.

### **Chihuahuan Basin Desert Scrub**

#### ***Atriplex canescens* Shrubland Alliance**

##### ***Atriplex canescens* / *Sporobolus airoides* Shrubland Association**

**Distribution:** throughout New Mexico; common in the BDA Rio Grande floodplain.

**Habitat:** alkaline swales and alluvial flats.

**Associates:** *Suaeda moquinii*.

**Comments:** typically occurs as monotypic stands of low diversity. Often found in a mosaic with *Sporobolus airoides* grasslands.

##### ***Atriplex canescens*/ *Suaeda moquinii* Shrubland Association**

**Distribution:** throughout New Mexico; occasional in the BDA Rio Grande floodplain.

**Habitat:** alkaline swales and alluvial flats.

**Associates:**

**Comments:** typically occurs as monotypic stands little herbaceous cover. Often found in a mosaic with *Sporobolus airoides* grasslands.

## Chihuahuan Mesquite Desert Scrub

### *Prosopis glandulosa* Shrubland Alliance

#### *Prosopis glandulosa* - *Atriplex canescens* Shrubland Association

**Distribution:** southern New Mexico. Occasional on the east side of the refuge along the edge of the floodplain.

**Habitat:** piedmont (bajada) footslopes.

**Associates:** *Larrea tridentata*, *Gutierrezia sarothrae*.

**Comments:** intershrub spaces are typically very sparse.

#### *Prosopis glandulosa* / *Sporobolus flexuosus* Shrubland Association

**Distribution:** southern New Mexico. Common in BDA east side dunes, particularly in the northern sector. Occasional on the east side of the refuge and in the floodplain.

**Habitat:** sandy plains and dunelands.

**Associates:** *Ephedra trifurca*, *Yucca elata*, *Gutierrezia sarothrae*, *Sporobolus contractus*, *S. giganteus*.

**Comments:** Intermixed with of *Psoralea scoparius* and *Artemisia filifolia* associations. Intershrub spaces are typically very sparse.

## Chihuahuan Foothill-Piedmont Desert Scrub

### *Fouquieria splendens* Shrubland Alliance

#### *Fouquieria splendens* / *Parthenium incanum* Shrubland Association

**Distribution:** southern New Mexico. Occasional on BDA in the Little San Pasqual Mountains; possible in Indian Wells and Chupadera wildernesses.

**Habitat:** upper piedmont slopes (bajadas) and rocky hill slopes.

**Associates:** *Aloysia wrightii*, *Larrea tridentata*, *Dalea formosa*, *Opuntia engelmannii*, *Fallugia paradoxa*, *Bouteloua eriopoda*.

**Comments:** minor association often intermixed with *Larrea tridentata* - *Parthenium incanum* Shrubland.

## Chihuahuan Creosotebush Desert Scrub

### *Larrea tridentata* Shrubland Alliance

#### *Larrea tridentata* / *Bouteloua eriopoda* Shrubland Association

**Distribution:** southern New Mexico. Common on the east side of BDA in the Little San Pasqual Mountains, and Indian Wells/Chupadera wildernesses on the west side.

**Habitat:** upper piedmont slopes (bajadas) and hill slopes.

**Associates:** *Flourensia cernua*, *Thymophylla acerosa*, *Parthenium incanum*, *Opuntia macrocentra*, *O. phaeacantha*, *Dalea formosa*, *Muhlenbergia porteri*, *Pleuraphis jamesii*.

**Comments:**

#### *Larrea tridentata* / *Muhlenbergia porteri* Shrubland Association

**Distribution:** southern New Mexico. Occasional on the east side of BDA in the Little San Pasqual Mountains, and likely in the Indian Wells/Chupadera wildernesses on the west side.

**Habitat:** mid to lower piedmont slopes (bajadas), dunelands.

**Associates:** *Prosopis glandulosa*, *Thymophylla acerosa*, *O. phaeacantha*, *Sporobolus flexuosus*.

**Comments:**

***Larrea tridentata* - *Parthenium incanum* Shrubland Association**

**Distribution:** southern New Mexico. Common on the east side of BDA in the Little San Pasqual Mountains, and Indian Wells/Chupadera wildernesses on the west side.

**Habitat:** upper piedmont slopes (bajadas) and hill slopes.

**Associates:** *Flourensia cernua*, *Thymophylla acerosa*, *Opuntia macrocentra*, *O. phaeacantha*, *Fouquieria splendens*, *Muhlenbergia porteri*, *Bouteloua eriopoda*.

**Comments:** *Bouteloua eriopoda* usually less than 2% cover.

***Larrea tridentata* / Sparse Shrubland Association**

**Distribution:** southern New Mexico. Common Indian Wells/Chupadera wildernesses on the west side; possible on the east side of BDA in the Little San Pasqual Mountains.

**Habitat:** piedmont slopes (bajadas).

**Associates:** *Prosopis glandulosa*, *Flourensia cernua*, *Muhlenbergia porteri*.

**Comments:** *Prosopis glandulosa* can co-dominate. Intershrub spaces are sparsely vegetated desert pavement.

***Larrea tridentata* / *Sporobolus flexuosus* Shrubland Association**

**Distribution:** central New Mexico. Uncommon on the east side of BDA in the Little San Pasqual Mountains; possible in Indian Wells/Chupadera wildernesses on the west side.

**Habitat:** upper piedmont slopes (bajadas) and hill slopes.

**Associates:** *Yucca elata*, *Opuntia phaeacantha*.

**Comments:**

### **3.3 Woodlands**

Open stands of trees with crowns not usually touching (generally forming 25 to 60% cover. Canopy tree cover (rarely) may be less than 25% in cases when the cover of each of the other lifeforms present (i.e., shrub, dwarf-shrub, herb, nonvascular) is less than 25% and tree cover exceeds the cover of the other lifeforms.

#### **Cold Temperate Woodlands**

##### **Rocky Mountain Pinyon- Juniper Woodland**

###### ***Juniperus monosperma* Woodland Alliance**

###### ***Juniperus monosperma* / *Stipa neomexicana* Woodland**

**Distribution:** central New Mexico. Uncommon on the east side of BDA in the Little San Pasqual Mountains.

**Habitat:** upper hill slopes and ridges.

**Associates:** *Dalea formosa*, *Aristida purpurea*.

**Comments:** scattered open stands along ridges.

## 4.0 ABIOTICS/LAND USE DESCRIPTERS

Nonvegetative landcover forms

### 4.1 Land Use Descriptors

#### Planted / Cultivated

**Distribution:** agricultural crops

**Habitat:** crop fields on BDA

**Associates:** *alfalfa, corn*

**Comments:**

#### Non Agriculturally Disturbed

**Distribution:** areas of recent or past soil disturbance dominated by early successional weedy and/or invasive plant species that does not fit into existing NVCS Alliance or Association

**Habitat:** crop fields on BDA

**Associates:** *Kochia scoparia, Ambrosia artemisiifolia, Aster sinosus, Conyza Canadensis, Convolvulus arvensis, Lepidium latifolium, Plantago plantain, Sorghum halepense*

**Comments:**

### 4.2 Abiotics

#### Bare Ground Sparsely Vegetated

**Distribution:** any area of bare ground or sparse vegetation

**Habitat:**

**Associates:** dirt roads, newly disturbed or cleared areas, etc...

**Comments:**

#### Water

**Distribution:** areas of open water

**Habitat:** managed wetlands, river

**Associates:**

**Comments:**

#### Paved with Sparse Vascular Vegetation

**Distribution:** any paved area or areas of barren rock

**Habitat:**

**Associates:** paved roads

**Comments:**

#### Urban

**Distribution:** developed areas containing building or facilities

**Habitat:** visitor center complex

**Associates:**

**Comments:**

## Literature Cited.

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U.S. Fish and Wildlife Service. 1988. *National list of vascular plant species that occur in wetlands*. US Fish & Wildlife Service Biological Report 88 (24).

